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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,372

09/28/2006

Gregory Faris

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EXAMINER

PURINTON, BROOKE J

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/597,372	FARIS ET AL.	
	Examiner	Art Unit	
	Brooke Purinton	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/21/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 22 is rejected under 35 U.S.C. 102(e) as being anticipated by Touzov (United States Patent Application Publication Number 2004/0115830).

An apparatus for moving droplets ("thermo-optic coherent microfluidic manipulator," 12, 166), comprising: a surface ("surface of 100 micron film of HOPG," 12, 167); a droplet on the surface ("diameter of said molecule is 20 nm," 12, 168); a light source producing a focused beam of light ("source of 280 nm laser with power .01mW," 12, 168); means for directing the beam of light at the droplet disposed on the surface (laser ... "is focused on said surface and slowly moves to draw spiral," 12-13, 168 around microdroplet, thus beam is indirectly directed toward the droplet) to heat the droplet ("z thermal conductivity," 13, 168, where droplet is obviously subject to thermal effect of laser) and cause a thermal gradient to form across the droplet sufficient to induce the droplet to move across the surface ("thus creation of temperature gradients causes disbalance in distribution of said energy that in many cases can cause physical displacement of said matter," 12, 167).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4-6, 8-10, 12, 16, and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velez (United States Patent Application Publication Number 2004/0211659) and Touzov.

Regarding Claim 1, Velez teaches a method of moving droplets, comprising: providing a liquid phase on a surface (“fluid 16 such as oil,” 2, 25 shown in Figure 1A); dispensing a droplet into the liquid phase (“the droplets 12 can be water droplets or hydrocarbon droplets,” 2, 26), the liquid phase being immiscible with the droplet (oil and water are immiscible).

Velez fails to teach focusing a beam of light at an edge of the droplet in the liquid phase to produce a thermal gradient sufficient to induce the droplet to move.

Touzov teaches focusing a beam of light at an edge of the droplet to produce a thermal gradient sufficient to induce the droplet to move (focusing the laser at the edge which contacts the surface, “source of 280 nm laser with power ... is focused on said surface and slowly moves to draw spiral with decreasing size... rotating thermal field will have temperature gradient ... rotating field produced focusing effect on said molecule and moves it into the center of rotation,” 12-13, 168 -169, where the Marangoni effect is used in “creation of temperature gradients ... cause physical displacement of matter,” 12, 167).

It would have been obvious to combine the technique of using a thermal gradient as disclosed by Touzov to substitute the electric field inducing movement of Velez since Velez discloses that his method allows “creation of complex shapes of dynamic thermal fields on device that causes molecules and droplets to migrate to predefined locations so no monitoring of their motion is required,” (13, 170).

Regarding Claim 2, Velev and Touzov teach the method of claim 1.

They fail to teach wherein the droplet forms a contact angle approaching 180° with respect to the surface.

However, since Velev state that “the contact angle hysteresis of the droplets can lead to strong capillary forces, which may increase losses of power and may pin the droplets onto surface contaminants and/or scratches,” (1, 6) it would be obvious to maximize the contact angle to reduce the hysteresis and improve the invention. Therefore, this would be considered a simple optimization of a result effective variable (In re Boesche 617 F.2d 1575), and as such, the limitation that the contact angle is 180° is not a patentable limitation.

Regarding Claim 4. Velev and Touzov teach the method of claim 1.

Touzov teaches wherein the beam of light passes near without contacting the droplet (“because radiation only interacts with the surface of substrate it provides thermal gradients significantly exceeding ones created by other methods,” 13, 170).

Regarding Claim 5. Velev and Touzov teach the method of claim 1.

Velev further teaches wherein the immiscible liquid phase includes an organic liquid (“hydrocarbons,” claim 2).

Regarding Claim 6. Velev and Touzov teach the method of claim 5.

Velev and Touzov fail to teach wherein the organic liquid includes decanol.

However, since decanol is an organic liquid much like those of Velev, it would have been a simple substitution of this substance into the modified apparatus of Velev and Touzov in order to create the same microdroplet manipulation effect.

Regarding Claim 8. Velev and Touzov teach the method of claim 1. Velev further teaches wherein the immiscible liquid phase comprises a first immiscible liquid and a second immiscible liquid (“when a thick layer of dodecane was poured on top of the perfluorinated hydrocarbon oil so that the droplets were immersed in a media with uniform dielectric constant, the particles remained essentially uniformly dispersed,” 5, 43); the second immiscible liquid having a greater density than that of the first immiscible liquid (thus, the dodecane (1st liquid) sitting on top of the oil (2nd liquid)) and of the droplet to produce a fluid-to- fluid interface between the immiscible liquids

Velev et al. fail to teach that it is on the fluid to fluid interface which the droplet sits.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention that a slight change of liquid 1 and 2's densities would have the same effect. Lacking any criticality, therefore, the placement of the drop either between the two liquids or on one the interface, is simply a design choice, since either situation allows the droplet to maintain the same contact angle as discussed in regards to Claim 2, and further, the second configuration allows the benefits of both liquid properties to be utilized in the movement or analysis of the droplet.

Regarding Claim 9. Velev and Touzov teach the method of claim 8.

Velev further teaches wherein the second immiscible liquid includes perflourinated Silicone oil (“liquid combination is selected from the group consisting of perfluorinated oil, silicone oil ... and/or chemical and/or physical combinations thereof,” Claim 2).

Regarding Claim 10. Velev and Touzov teach the method of claim 1

They fail to teach wherein the thermal gradient forms within the droplet.

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Touzov implicitly teaches that the thermal gradient forms within the droplet ("free surface energy of physical matter depends on its temperature," 12, 167, where this temperature gradient would have to somehow effect the surface of the droplet and thus cause a gradient there, to drop the surface energy sufficiently for the droplet to move in a specific direction as induced by the laser heating of Touzov).

Motivation to combine same as for Claim 1.

Regarding Claim 12. The method of claim 1,

Velev further teaches wherein the droplet is aqueous ("wherein said fluid droplet comprises water," Claim 7).

Regarding Claim 16. Velev and Touzov teach the method of claim 1.

Velev further teaches wherein the droplet is a first droplet, and further comprising depositing a second droplet into the immiscible liquid phase and moving the first droplet into the second droplet to cause the droplets to fuse and contents of the droplets to mix ("in some embodiments, the electrodes can be configured to provide two or more pathways that may intersect to combine droplets," 2, 28, where it would be obvious to use the modified apparatus to do the same).

Regarding Claim 17. Velev and Touzov teach the method of claim 16.

Velev further teaches wherein each droplet contains a chemical fragment ("said fluid droplet comprises ... drugs, toxins, chemical compounds," Claim 7).

Regarding Claim 18. Velev and Touzov teach the method of claim 16.

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Velev further teaches detecting a biological molecule in the fused droplet ("for example, bio assays can be provided, which include microsphere agglutination or fluorescence assays for proteins, DNA, RNA, viruses or other biologically specific markers," 2, 28).

Regarding Claim 19. Velev and Touzov teach the method of claim 16.

Velev teaches it further comprising detecting a gene in the fused droplet ("DNA, RNA" 2, 28).

Regarding Claim 20. Velev and Touzov teach the method of claim 16.

Velev teaches it further comprising detecting products of gene expression of a particular gene ("as another example, viability assays can be used to detect the viability status of cells, bacteria or viruses in droplets by mixing a droplet containing the cell, bacteria, or virus of interest, containing a toxin, virus, protein, or other disease causing agent," 2, 28, where the detection of viability could potentially work through detection of gene expression of a particular gene).

Regarding Claim 21. Velev and Touzov teach the method of claim 1.

Touzov further implicitly teaches it comprising turning the light beam on and off to perform thermal cycling of the droplet ("DLP allows dynamic laser switching of specific beams thus providing additional flexibility in apparatus employment,").

While he does not specifically state that thermal cycling is performed, it would have been obvious to one of ordinary skill in the art that turning off some of the beams and then restoring them would cause a thermal cycle, and this whole setup would additionally provide more control over the creation of thermal gradients if beams could be operated (or cycled) with only a percentage of the full power.

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Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Velev and Touzov as applied to claim 1 above, and further in view of Garnier et al. (GARNIER, NICOLAS, ROMAN O. GRIGORIEV, MICHAEL F. SHATZ; Optical Manipulation of Microscale Fluid Flow; Physical Review Letters; July 30, 2003; 054501-1 to 054501-4; Vol. 92, No. 5; The American Physical Society, USA.).

Regarding Claim 11. Velev and Touzov teach the method of claim 1.

They fail to teach wherein the thermal gradient forms in the immiscible liquid phase.

Garnier et al. teach wherein a thermal gradient forms in a liquid phase ("the fluids move when gradients in temperature induce surface tension differences," page 1, column, paragraph 1).

It would have been obvious to one of ordinary skill to create a temperature gradient in the immiscible fluid of Velev and Touzov since the immiscible liquid will respond to, and induce movement indirectly in the microdroplet, because of the temperature gradient, which is another way of creating the intended effect of inducing movement in the microdroplet.

Claims 13 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velev and Touzov and Touzov alone as applied to claims 1 and 22 above, and further in view of Wolke et al. (United States Patent Number 6539956).

Regarding Claim 13 and 28. Velev and Touzov teach the method of claim 1 and Touzov teaches the apparatus of claim 22.

Both fail to teach wherein the beam of light includes an infrared wavelength.

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Wolke et al. teach using an infrared laser to heat a liquid meniscus due to the lasers easy ability to focus (“such radiation has the advantage that it can be generated very easily, passes through certain materials, such as a hood over the liquid bath, and can be very easily focused upon the meniscus of the liquid. The electromagnetic radiation preferably comprises microwaves, infrared radiation, and/or visible radiation,” 1-2, 64-5).

Therefore, it would have been obvious to try and use an infrared wavelength laser to create an optical gradient since an infrared laser would be able to excite the liquid molecules and give the user more control over the process.

Claims 23-27, 29 and 32-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Touzov as applied to claim 22 above, and further in view of Velez.

Regarding Claim 23, Touzov teaches the apparatus of claim 22.

He fails to teach it further comprising a liquid phase on the surface, the liquid phase being immiscible with the droplet, and wherein the droplet is surrounded by the immiscible liquid phase.

Velez teaches a microdroplet mover comprising a liquid phase on the surface, the liquid phase being immiscible with the droplet, and wherein the droplet is surrounded by the immiscible liquid phase (See Figure 2A, where the water droplets 12 are surrounded around the circumference by the oil 16 and these two liquids are immiscible).

It would have been obvious to combine Touzov and Velez since Velez states that “the contact angle hysteresis of the droplets can lead to strong capillary forces, which may increase losses of power and may pin the droplets onto surface contaminants and/or scratches,” (1, 6). Therefore, immersing the bottom half of the microdroplet in liquid as a carrier allows the

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surface interaction with the substrate to be minimized and the droplet to flow unhindered by capillary forces, friction, or contaminants.

Regarding Claim 24. Touzov and Velez teach the apparatus of Claim 23.

Velez further teaches wherein the immiscible liquid phase comprises a first immiscible liquid and a second immiscible liquid (“when a thick layer of dodecane was poured on top of the perfluorinated hydrocarbon oil so that the droplets were immersed in a media with uniform dielectric constant, the particles remained essentially uniformly dispersed,” 5, 43); the second immiscible liquid having a greater density than that of the first immiscible liquid (thus, the dodecane (1st liquid) sitting on top of the oil (2nd liquid)) and of the droplet to produce a fluid-to-fluid interface between the immiscible liquids

Velez et al. fail to teach that it is on the fluid to fluid interface which the droplet sits.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention that a slight change of liquid 1 and 2's densities would have the same effect. Lacking any criticality, therefore, the placement of the drop either

Regarding Claim 25. Touzov and Velez teach the apparatus of Claim 24.

Velez further teaches wherein the second immiscible liquid includes perfluorinated Silicone oil (“liquid combination is selected from the group consisting of perfluorinated oil, silicone oil ... and/or chemical and/or physical combinations thereof,” Claim 2).

Regarding Claim 26. Touzov and Velez teach the apparatus of Claim 25.

Velez further teaches wherein the immiscible liquid phase includes an organic liquid (“hydrocarbons,” claim 2).

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Regarding Claim 27. Touzov and Velez teach the apparatus of Claim 26.

Velez and Touzov fail to teach wherein the organic liquid includes decanol.

However, since decanol is an organic liquid much like those of Velez, it would have been a simple substitution of this substance into the modified apparatus of Velez and Touzov in order to create the same microdroplet manipulation effect.

Regarding Claim 29. Touzov teaches the apparatus of claim 22.

Touzov fails to explicitly teach wherein the droplet is aqueous.

Velez teaches an aqueous droplet in a similar apparatus (“wherein said fluid droplet comprises water,” Claim 7).

It would have been obvious to substitute the aqueous solution of Velez into the microdroplet manipulator of Touzov et al. since this would comprise a simple substitution of one known element for another to obtain the predictable results, since an aqueous solution would also behave in the same manner as the microdroplet behavior described in paragraph 170 and 173 of Touzov.

Regarding Claim 32. Touzov teaches the apparatus of Claim 22.

He fails to teach the droplet is a first droplet, and further comprising depositing a second droplet into the immiscible liquid phase and moving the first droplet into the second droplet to cause the droplets to fuse and contents of the droplets to mix.

Velez further teaches wherein the droplet is a first droplet, and further comprising depositing a second droplet into the immiscible liquid phase and moving the first droplet into the second droplet to cause the droplets to fuse and contents of the droplets to mix (“in some embodiments, the electrodes can be configured to provide two or more pathways that may

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intersect to combine droplets," 2, 28, where it would be obvious to use the modified apparatus to do the same).

It would have been obvious to combine the apparatus of Touzov and the multidroplet mixing of Velev since Velev utilizes multiple droplets to analyze chemical substances, biological substances and their respective reactions when combined. Therefore, combination such as performed in Velev adds a flexibility to the apparatus that would be desirable to one of ordinary skill in the art.

Regarding Claim 33. Touzov and Velev teach the apparatus of Claim 32.

Velev further teaches wherein each droplet contains a chemical fragment ("said fluid droplet comprises ... drugs, toxins, chemical compounds," Claim 7).

Regarding Claim 34. Touzov and Velev teach the apparatus of Claim 32.

Velev further teaches detecting a biological molecule in the fused droplet ("for example, bio assays can be provided, which include microsphere agglutination or fluorescence assays for proteins, DNA, RNA, viruses or other biologically specific markers," 2, 28).

Regarding Claim 35. Touzov and Velev teach the apparatus of Claim 32.

Velev teaches it further comprising detecting a gene in the fused droplet ("DNA, RNA" 2, 28).

Regarding Claim 36. Touzov and Velev teach the apparatus of Claim 32.

Velev teaches it further comprising detecting products of gene expression of a particular gene ("as another example, viability assays can be used to detect the viability status of cells, bacteria or viruses in droplets by mixing a droplet containing the cell, bacteria, or virus of

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interest, containing a toxin, virus, protein, or other disease causing agent,” 2, 28, where the detection of viability could potentially work through detection of gene expression of a particular gene).

Claims 14 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velev and Touzov and Touzov as applied to claims 1 and 22 above, respectively and further in view of Baer et al. (United States Patent Number 6469779).

Regarding Claim 14. Velev and Touzov teach method of claim 1.

They fail to teach it further comprising inserting dye into one of the droplet and the immiscible liquid phase to cause optical absorption by molecules of the dye

Regarding Claim 30. Touzov teaches the apparatus of Claim 2.

He fails to teach wherein the droplet includes a dye to cause optical absorption by the droplet.

Baer et al. teach a laser capture microdissection method and apparatus which utilizes dye that causes optical absorption (“This film is manufactured containing organic dyes that are chosen to selectively absorb in the near infrared region of the spectrum overlapping the emission region of common AlGaAs laser diodes. When the film is exposed to the focused laser beam the exposed region is heated by the laser,” paragraph 13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize this organic light-absorptive dye in order to further control imbuing the microdroplet or immiscible liquid with a temperature gradient, since a lack of light absorption, or a non even light absorption could affect the microdroplets ability to move or it's speed when movement is attained.

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Claims 3, 7, 15 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Velev and Touzov and Touzov as applied to claims 1 and 22 above, respectively, and further in view of Kulin et al. (KULIN, SIMONE, RANI KISHORE, KRISTIAN HELMERSON, LAURIE LOCASCIO; Optical Manipulation and Fusion of Liposomes as Microreactors; Langmuir; June 26, 2003; 8206-8210; Vol. 19, No. 20; American Chemical Society.).

Regarding Claims 3. Velev and Touzov teach the method of claim 1.

They fail to teach wherein the beam of light contacts the droplet.

Kulin et al. disclose that a UV light contacts the liposome (“for all fusion experiments, the position of the UV laser was kept fixed and the liposomes were manipulated such that their membranes touched at this position,” 8207, col 2, paragraph 2).

Despite the laser focus being intended for fusion uses, it would have been obvious to one of ordinary skill in the art to try and see if the same thermal gradient could be induced in the droplet without immersing it in a liquid, since it has been ruled that applying a known technique (focusing the laser into the solution to contact the liposome/droplet) to a known device (the modified apparatus of Velev and Touzov) which is ready for improvement would yield the predictable results (of either inducing motion or not inducing motion). Thus this cannot be considered a patentable limitation.

Regarding Claim 7. Velev and Touzov teach the method of claim 1.

Velev and Touzov fail to teach wherein the immiscible liquid phase controls evaporation of the droplet, since Velev displays the droplet half in and half out of the liquid.

Kulin et al. teaches wherein the immiscible liquid phase controls evaporation of the droplet, since the droplet (e.g. liposome) is completely immersed in an external fluid (“the

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liposomes stably entrap molecules while bathed in an aqueous solution, allowing control over the internal environment and eliminating concerns about evaporation,” 8206, col 2, line 9-11).

It would have been obvious to combine the modified method of Velev and Touzov in order to use the immersion technique of Kulin et al. since Kulin et al. disclose the liposome as "self enclosed nanovials" (8206, col 2, line 2) exactly to combat the problem of evaporation in prior art (“open volume nanovials... the control of evaporation is a major issue,” 8206, col 1, paragraph 2).

Regarding Claim 15 and 31. Velev and Touzov teach the method of claim 1, and Touzov alone teaches the apparatus of Claim 22.

They fail to teach wherein a size of the droplet ranges from approximately 30 μm to 1500 μm in diameter.

Kulin et al. utilize a liposome which ranges “in size from .5 – 50 microns,” (8206, col 2, paragraph 1) which is manipulated with optical tweezers and fused together, for mixing of chemicals and other similar uses to the method of Claim 1 or apparatus of Claim 22.

It would have been obvious therefore, to try and utilize a microdroplet in this size in order to have a substantial enough volume with which to incorporate other material into the droplet and therefore, analyze these materials. Additionally, a change in size is generally recognized as being within the level of ordinary skill in the art. (In re Rose, 105 USPQ 237) and in this instance, changing the microdroplet size to a larger (macro) droplet would be a simpler process than miniaturizing it further. Therefore, it would only take a reversal of the prior art to achieve this.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

United States Patent Number 3808550 – discusses thermal forces.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brooke Purinton whose telephone number is 571.270.5384. The examiner can normally be reached on Monday - Friday 7h30-5h00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571.272.2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brooke Purinton
Examiner
Art Unit 2881
/B. P./
Examiner, Art Unit 2881

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881

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